

WHAT IS CLAIMED IS:

1       1. An exhaust gas purification apparatus for an engine,  
2 comprising:

3               a catalytic converter provided in an exhaust path  
4 of said engine and including a carrier, an HC absorbent  
5 carried on said carrier for absorbing HC in exhaust gas  
6 of said engine, an HC purifying catalyst carried on said  
7 carrier and capable of purifying the HC desorbed from said  
8 HC absorbent, and a transition metal carried on said carrier  
9 for absorbing CO in the exhaust gas; and

10               a control apparatus for controlling operation of  
11 said engine, said control apparatus including HC  
12 desorption timing estimation means for estimating a timing  
13 at which the HC is desorbed from said HC absorbent and  
14 control means for controlling an air fuel ratio upon  
15 starting of said engine to a ratio richer than a  
16 stoichiometric air fuel ratio to start operation of said  
17 engine and changing over the air fuel ratio to a ratio  
18 leaner than the stoichiometric air fuel ratio at the timing  
19 at which the HC is desorbed based on an output of said  
20 HC desorption timing estimation means.

1       2. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 1, wherein said HC absorbent is carried  
3 in a layered state on a surface of said carrier, and said  
4 HC purifying catalyst is carried in a layered state on

5 a surface of the layer of said HC absorbent.

1 3. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 1, wherein said transition metal is  
3 carried in a layer of said HC purifying catalyst.

1 4. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 1, wherein said transition metal is  
3 nickel.

1 5. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 4, wherein the nickel is contained  
3 by approximately 20 to 30 g/L in the form of NiO.

1 6. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 1, further comprising temperature  
3 detection means for detecting a temperature of said HC  
4 absorbent or a temperature corresponding to the  
5 temperature of said HC absorbent, said HC desorption timing  
6 estimation means estimating the timing at which the HC  
7 is desorbed based on an output of said temperature detection  
8 means.

1 7. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 1, wherein said HC desorption timing  
3 estimation means estimates the timing at which the HC is  
4 desorbed based on an elapsed period of time after the

5 starting of said engine.

1 8. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 1, wherein said HC desorption timing  
3 estimation means estimates the timing at which the HC is  
4 desorbed based on a total fuel injection amount of said  
5 engine after the starting of said engine.

1 9. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 7, further comprising water temperature  
3 detection means for detecting a temperature of cooling  
4 water of said engine, said HC desorption timing estimation  
5 means estimating the timing at which the HC is desorbed  
6 additionally based on temperature information detected  
7 by said water temperature detection means.

1 10. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 8, further comprising water temperature  
3 detection means for detecting a temperature of cooling  
4 water of said engine, said HC desorption timing estimation  
5 means estimating the timing at which the HC is desorbed  
6 additionally based on temperature information detected  
7 by said water temperature detection means.

1 11. The exhaust gas purification apparatus for an engine  
2 as claimed in claim 1, wherein said HC absorbent is zeolite.

1       12. The exhaust gas purification apparatus for an engine  
2       as claimed in claim 1, further comprising air fuel ratio  
3       detection means for detecting an air fuel ratio after said  
4       catalytic converter, said HC desorption timing estimation  
5       means estimating the timing at which the HC is desorbed  
6       based on an output of said air fuel ratio detection means.

1       13. The exhaust gas purification apparatus for an engine  
2       as claimed in claim 1, wherein said catalytic converter  
3       is provided at a downstream portion of said exhaust path.

1       14. The exhaust gas purification apparatus for an engine  
2       as claimed in claim 13, wherein said engine and said  
3       catalytic converter are directly connected to each other  
4       without intervention of any other catalytic converter.